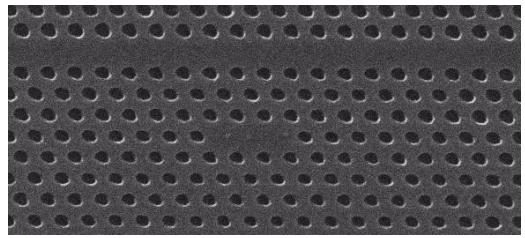
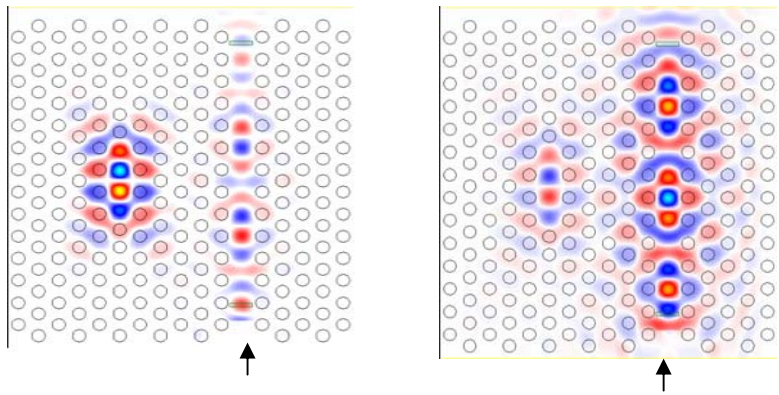
Optical Nonlinear Photonic Crystal Logic Devices in AlGaAs

Motivation: Fabrication and characterization of all-optical logic devices employing $\chi^{(3)}$ Kerr-nonlinearities in AlGaAs.

Result and Significance:
Proposed photonic band gap device to demonstrate all-optical memory through optical bistability. Device is characterized by microwatt (μW) switching powers and near-instantaneous response time (~ps). Additional all-optical logic functions (transistor, switch, AND) are also possible using multiple beam inputs.



SEM of bistable cavity-waveguide system



On-resonance State "0"

Off-resonance State"1"

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